

***COCCOBAPHES SANGUINARIUS* AND *LYGOCORIS VITICOLLIS*
(HEMIPTERA: MIRIDAE): SEASONAL HISTORY AND DESCRIPTION
OF FIFTH-INSTAR, WITH NOTES ON OTHER MIRIDS
ASSOCIATED WITH MAPLE**

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Abstract.—Seasonal history of the mirids *Coccobaphes sanguinarius* Uhler and *Lygocoris vitticollis* (Reuter) was followed on red maple, *Acer rubrum* L., in southcentral Pennsylvania during 1979-80. Both are univoltine species whose nymphs feed on the undersides of expanding foliage. Although overwintered eggs of both species hatched in early May, adults of *L. vitticollis* first appeared in early June, about 7-10 days before those of *C. sanguinarius*. Feeding by *L. vitticollis* produces translucent spots at sites of stylet penetration on red maple leaves; when dead tissue tears or drops from the feeding sites, the foliage appears ragged or perforated. A diagnosis of the fifth-instar of both mirids is given, along with biological notes on *L. hirticulus* (Knight) and other mirids found associated with Pennsylvania maples.

During studies on the mirid fauna of Pennsylvania, T. J. Henry and I accumulated data on host plants and phenology of the species associated with maple, *Acer* spp. I began a more intensive study of the fauna when my colleague K. Valley brought to my attention the unusual injury that *Lygocoris vitticollis* (Reuter) produces on leaves of red maple, *A. rubrum* L. In this paper I summarize the seasonal history and host plants of the two principal mirids occurring on Pennsylvania maples, *L. vitticollis* and *Coccobaphes sanguinarius* Uhler, and give a diagnosis of the fifth-instar nymphs. Notes on seasonal history are given for *L. hirticulus* (Knight) and other mirids collected from but not restricted to breeding on maple.

STUDY SITES AND METHODS

The main study area near Harrisburg (Dauphin Co.), Pennsylvania, was dominated by a dense stand of Virginia pine, *Pinus virginiana* P. Mill., with an understory of grasses and forbs mixed with the rosaceous shrub ninebark,

Physocarpus opulifolius (L.) Maxim., and red maple. The maples were young trees about 2–3 m high, plus smaller saplings.

I sampled red maple weekly from mid-May to late June 1979. In April 1980 I began to collect from red maple to determine first egg hatch of *L. vitticollis* and *C. sanguinarius* and then made weekly collections through July once eggs had begun to hatch (early May). Mirids were sampled by beating branches over a small tray (Wheeler, 1980) or sweeping branches with a beating net. All specimens taken in approximately 15 minutes of collecting were identified to stage in the field (adults, late instars) and returned to the host plants; instars I–III were placed in alcohol and sorted in the laboratory under a binocular microscope. Populations of *L. vitticollis* and *C. sanguinarius* were much smaller than those known for several orthotyline mirids, e.g., *Diaphnocoris chlorionis* (Say) (Wheeler and Henry, 1976), or *Brachynotocoris puncticornis* Reuter (Wheeler and Henry, 1980). Thus, a typical sample consisted only of 3–7 specimens of each species rather than the many hundreds of certain orthotyline species that could be collected in 15 minutes. To determine possible injury to host foliage by the two main species, nymphs of different stages were placed in small plastic dishes containing fresh sprigs of red maple, and any feeding damage was noted.

Lygocoris vitticollis (Reuter)

This mirid, widely distributed in eastern North America, is known from Nova Scotia south to Mississippi and west to Kansas (Kelton, 1971). *Lygocoris vitticollis*, along with the ubiquitous tarnished plant bug, *Lygus lineolaris* (Palisot de Beauvois), and fourlined plant bug, *Poecilocapsus lineatus* (F.), was one of the first North American mirids reported to damage shade trees or ornamental plants. In the spring of 1882 Murtfeldt observed injury to young foliage of silver maple, *A. saccharinum* L., at Kirkwood, Missouri; unfolding leaves, initially stippled with transparent spots, soon became perforated (Murtfeldt, 1887). Uhler (1887), unaware of Reuter's (1876) description published without a host association, described Murtfeldt's "noxious capsid" as a new species, *Lygus monachus*. Uhler's name thus is a junior synonym of Reuter's *vitticollis* (Reuter, 1909).

Since Murtfeldt's time, there apparently have been no further reports of *L. vitticollis* damaging maple, and little information on habits has been added. Murtfeldt was perceptive to associate the tattered appearance of maple leaves with a sucking, rather than chewing, insect, but some of her observations, made before life histories of North American mirids were generally known, have proved inaccurate.

Seasonal history and habits.—Eggs that overwintered near dormant leaf buds of red maple began to hatch shortly after leaf flush, about 7 May in 1980. Early instars fed on the undersides of tiny, expanding leaves; the pale, whitish-green nymphs resembled the color of this young foliage. The pop-

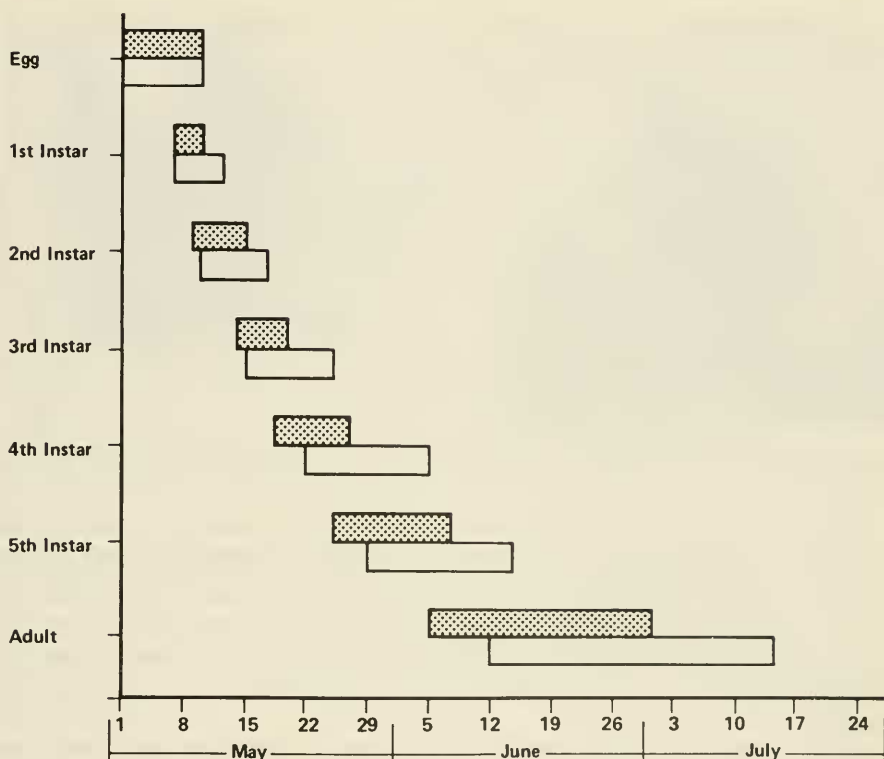


Fig. 1. Generalized seasonal history of *Lygocoris vitticollis* (shaded bar) and *Coccobaphes sanguinarius* (open bar) in central Pennsylvania, 1979-80.

ulation consisted mainly of third-instars by mid-May and fifth-instars by the last week of May in both years of study (Fig. 1). Adults began to appear during the first week of June and were present only for 3-4 weeks, males dying about a week before females. In the weekly collections, adults of this univoltine mirid no longer were present after 21 June in 1979; two females were collected on 30 June in 1980. The latest known collection of *L. vitticollis* in Pennsylvania is 22 July at Patton by the hemipterist Rev. Modestus Wirtner (Wheeler and Henry, 1977).

Injury became noticeable when the population consisted mainly of third-instars (mid-May) and appeared as translucent, irregularly shaped blotches on curled, unfolding leaves (Fig. 2). In the laboratory nymphs provided with fresh foliage produced this characteristic damage within 12-24 hours. As leaves expand, the thin tissue remaining at the feeding site tears or drops out (Fig. 3). The resulting ragged appearance of the foliage easily could be blamed on feeding by lepidopteran larvae or some other chewing insect.



Figs. 2, 3. Injury to red maple by *Lygocoris vitticollis*. 2, Translucent areas on expanding foliage. 3, Ragged edges and holes resulting from dead tissue tearing and dropping from leaf.

Injury seemed disproportionate to the size of populations since fewer than ten bugs were taken in any sample during 1979–80. Populations, however, may fluctuate from year to year; Murtfeldt (1887) noted that populations were greater in 1886 than in her previous seasons of observation. At only two localities in New York, Knight (1917) was able to collect unusually large numbers (250 and 118 adults) from sugar maple, *A. saccharum* H. Marsh.

Host plants.—The principal hosts are silver maple (Murtfeldt, 1887) and red and sugar maple (Knight, 1917). In addition to the population studied on red maple, I collected *L. vitticollis* from this host in other old fields and in hedgerows and nurseries, mostly on cut-over trees or saplings. I also found this species breeding on silver maple in Pennsylvania and have seen a series of specimens taken on silver maple in Berkeley Co., West Virginia.

Lygocoris vitticollis appears to be a specialist mirid confined to maple. Records from other plants, e.g., *Ulmus* sp. (Akingbohunge et al., 1972), probably reflect dispersal of adults from maple. Adults of *Lygocoris* spp. show a strong tendency to disperse to non-host plants (Kelton, 1971; Wheeler, unpublished data).

Description of fifth-instar.—Length 4.68 mm. Elongate oval, uniformly pale or whitish green, apex of labial segment IV darker. Sparsely clothed with pale, recumbent setae, intermixed with a few semierect setae. Antenna: I, length 0.48 mm; II, 1.46 mm; III, 1.22 mm; IV, 0.66 mm. Rostrum, length 1.20 mm, reaching bases of mesocoxae. Wing pads reaching 4th abdominal segment; dorsal abdominal scent gland opening pale, indistinct.

On maple, nymphs of *L. vitticollis* may be distinguished from those of *L. hirticulus* by their pale, uniformly whitish-green color. Knight (1917) was the first to note that *vitticollis* nymphs differed from those of other species

of *Lygocoris* (cited as the *communis* group or Group VI of the genus *Lygus* Hahn).

Coccobaphes sanguinarius Uhler

Although the recorded distribution of *C. sanguinarius* is similar to that of *L. vitticollis*—Ontario south to Florida and west to Missouri (Carvalho, 1959)—its habits are not as well known. Drake (1922) found this mirid on striped maple, *A. pennsylvanicum* L.; Knight (1923) recorded the second growth of young sugar, and less often, red maple as hosts; and Watson (1928) added silver maple as a host. I am aware of only one reference to *C. sanguinarius* in the economic literature. At Knoxville, Tennessee, a population on "hard maples" attracted attention when large numbers of this brilliant red bug fell to the ground beneath host trees (Bentley, 1941).

Seasonal history and habits.—Overwintered eggs, like those of *L. vitticollis*, hatched during early May, and nymphs fed on the lower surfaces of young, expanding foliage. Based on two seasons' observations, nymphal development appeared to take somewhat longer, so that populations of *C. sanguinarius* consisted mainly of fifth- and a few fourth-instars when adults and fifth-instars of *L. vitticollis* were present (Fig. 1). Adults of *C. sanguinarius* first appeared in the 12 June collection and were present at the sample site until mid-July. The latest Pennsylvania record of this single-brooded species is 1 Aug., based on Rev. Wirtner's collecting at Patton (Wheeler and Henry, 1977).

Since *Coccobaphes* nymphs fed on new growth of red maple in company with *Lygocoris* nymphs, it was not possible from field observations to determine whether *C. sanguinarius* also injured host foliage. In the laboratory, nymphs did not produce any visible damage no matter how long they were confined with unblemished leaves of red maple.

The number of specimens taken in both seasons was small, with a typical sample consisting of 4–6 specimens. Froeschner (1949) noted that in Missouri *C. sanguinarius* was "rather scarce."

Host plants.—Although adults have been collected from beech, *Fagus* sp. (Van Duzee, 1889), serviceberry or Juneberry, *Amelanchier* sp. (Wheeler and Henry, 1977), and mountain ash, *Sorbus* sp. (Drake, 1922), there is no evidence that plants other than *Acer* spp. serve as hosts. Like *L. vitticollis*, *C. sanguinarius* is most abundant on sapling and second-growth red and sugar maple. In addition to Knight's (1923) record of *sanguinarius* from red and sugar maple, this mirid has been taken on the latter host at Cincinnati, Ohio (U.S. National Museum collection). I have seen a series of specimens collected from striped maple at Cranberry Lake, New York (Cornell University collection).

Description of fifth-instar.—Length 4.40 mm. Broadly oval, uniformly bright red except antennal segment II, apex of labial segment IV, and tibiae

fusco-reddish to black; and antennal segments III–IV and tarsi white. Head, pronotum, and wing pads with short erect and semierect pale setae; abdomen more sparsely set with pale setae, longer bristle-like setae along lateral margins of segments IX–X. Antenna with black bristle-like setae, becoming more fine and sparse on segments III–IV; I, length 0.88 mm; II, 2.06 mm; III, 1.28 mm; IV, 1.40 mm. Rostrum, length 2.00 mm, reaching bases of metacoxae. Wing pads reaching abdominal segment VI; dorsal abdominal scent gland opening indistinct, surrounded by brighter red area.

Nymphs of *C. sanguinarius* may be separated easily from nymphs of other mirid species breeding on maple. They are distinguished by their bright red color with contrasting white on the last two antennal segments and the tarsi.

OTHER SPECIES

Several mirids whose hosts include various hardwoods were found breeding on maple in Pennsylvania. The mirine *Lygocoris hirticulus* was the most common of these additional *Acer* inhabitants. This species was present on red maple at the sample site in both years of study, with adults appearing the first week of June along with those of *L. vitticollis*. Nymphs of the two *Lygocoris* species often are distinguishable in the field; those of *L. hirticulus* differ from those of *vitticollis* by being yellowish green rather than pale whitish green. Adults of *L. hirticulus* were present at the main sample site until mid-July. This phytophagous, univoltine mirid, collected previously on maple (Hussey, 1922; Blatchley, 1926), also breeds on other deciduous trees, especially birch (*Betula* spp.) and beech (*Fagus* spp.) in Pennsylvania.

Other mirids found breeding on Pennsylvania maples include the predators *Deraeocoris nebulosus* (Uhler), *Diaphnocoris provancheri* (Burque) (= *pellucida* (Uhler)), *Hyaliodes* sp. (nymphs only—*harti* Knight or *vitripennis* (Say), or both), and *Phytocoris* spp. *Deraeocoris nebulosus* was common on sycamore maple, *A. pseudoplatanus* L., heavily infested with the aphid *Drepanosiphum platanoides* (Schrank) (Wheeler et al., 1975). *Diaphnocoris provancheri*, a species of at least partially predacious habits, is known to occur on maple (Hussey, 1922).

ACKNOWLEDGMENTS

I thank my colleagues J. F. Stimmel for the photographs and K. Valley for calling my attention to damage inflicted by *L. vitticollis* and for reading the manuscript. E. R. Hoebeke, Cornell University, Ithaca, N.Y., also read the manuscript.

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